

Serial No. 09/898,040  
Amendment dated March 13, 2006  
Reply to Office Action of October 12, 2005

Docket No. K-0280

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-42. (Canceled).

43. (Currently Amended) A method of rate adaptation in a communication apparatus, comprising:

~~providing information bits of a prescribed data rate to an input of an encoder, the encoder having a prescribed code rate;~~

~~adapting the prescribed code rate of the encoder and providing coded bits, based on an adapted code rate, to an output of the encoder, the prescribed code rate being adapted to the adapted code rate for providing a coding gain; and~~

encoding information bits by an encoder at a coding rate, the coding rate being fixed to a specific value among at least two different values using a puncturing block in the encoder according to a ratio of a channel interleaver size and a number of the information bits;

performing repetition or puncturing of the coded bits by a rate matching device,  
~~the output of the encoder being coupled to an input of the rate matching device~~ for matching a  
size of the coded bits to the channel interleaver size; and

interleaving the result of the repetition or puncturing ~~which is provided from an~~  
~~output of the rate matching device to an input of an interleaver~~ according to the channel  
interleaver size.

44. (Canceled).

45. (Currently Amended) The method of claim 43, wherein ~~the adapted code rate of~~  
~~the encoder is one of the~~ at least two different values included at least two of 1/2, 1/3, 1/4,  
and 1/5.

46. (Canceled).

47. (Currently Amended) The method of claim 43, wherein the encoder is a turbo  
encoder ~~with a maximum code rate of 1/5.~~

48. (Canceled).

49. (Previously Presented) The method of claim 43, wherein symbol puncturing is enabled for symbol groups having indices  $2j$  and  $2j+1$  if  $(j \bullet k) \bmod J < K$ , wherein 'I' is a number of information bits per frame, 'J' equals  $\lfloor I/2 \rfloor$ , 'N' is a size of the interleaver, 'K' equals  $\lfloor (L-N)/2 \rfloor$ , and 'L' is a number of coded bits, and wherein each of the symbol groups comprises  $L/I$  coded bits.

50. (Previously Presented) The method of claim 49, wherein the information bits include data bits and a pattern used to puncture the symbol group 'i' for the adapted code rate of  $1/3$  turbo code rate when a prescribed ratio  $\alpha < N \leq 3I$  is given by  $P_{(i \bmod 2)}$ , wherein 'i' is an index of the symbol groups and ranges from 0 to  $I-1$ , and wherein the pattern to puncture symbol groups corresponding to coded bits of data bits is '110' for  $P_0$  and '101' for  $P_1$ , where '1' indicates no puncturing of the coded bit in the symbol group 'i' and '0' indicates puncturing of the coded bit in the symbol group 'i'.

51. (Previously Presented) The method of claim 50, wherein the information bits further includes tail bits and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '101' for  $P_0$  and '101' for  $P_1$ .

52. (Previously Presented) The method of claim 49, wherein the information bits include data bits and a pattern used to puncture the symbol group 'i' for the adapted code rate of 1/4 turbo code rate when  $3I < N \leq 4I$  is given by  $P_{(i \bmod 2)}$ , wherein 'i' is an index of the symbol groups and ranges from 0 to I-1, and wherein the pattern to puncture symbol groups corresponding to coded bits of data bits is '1011' for  $P_0$  and '1110' for  $P_1$ , where '1' indicates no puncturing of the coded bit in the symbol group 'i' and '0' indicates puncturing of the coded bit in the symbol group 'i'.

53. (Previously Presented) The method of claim 52, wherein the information bits further include tail bits and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '1011' for  $P_0$  and '1011' for  $P_1$ .

54. (Previously Presented) The method of claim 49, wherein the information bits include data bits and a pattern used to puncture the symbol group 'i' for the adapted code rate of 1/5 turbo code rate when  $4I < N \leq 5I$  is given by  $P_{(i \bmod 2)}$ , wherein 'i' is an index of the symbol groups and ranges from 0 to I-1, and wherein the pattern to puncture symbol groups corresponding to coded bits of data bits is '11101' for  $P_0$  and '11011' for  $P_1$ , where '1' indicates no puncturing of the coded bit in the symbol group 'i' and '0' indicates puncturing of the coded bit in the symbol group 'i'.

55. (Previously Presented) The method of claim 54, wherein the information bits further include tail bits and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '11011' for  $P_0$  and '11011' for  $P_1$ .

56. (Withdrawn) A communication device having a rate adaptation mode, comprising:

an encoder for receiving information bits at a prescribed data rate and having a prescribed code rate, wherein when the prescribed data rate changes, the prescribed code rate of the encoder is adapted to an adapted code rate for providing coding gain, and the encoder providing coded bits based on the adapted code rate;

a rate matching device for receiving the coded bits based on the adapted code rate from the encoder, and repeating or puncturing a prescribed number of coded bits; and

an interleaver for receiving an output of the rate matching device.

57. (Canceled).

58. (Withdrawn) The device of claim 56, wherein the prescribed rate of the encoder is adapted to be one of  $1/3$ ,  $1/4$ , and  $1/5$ .

59. (Withdrawn) The device of claim 56 or 58, wherein 'N' is a size of the interleaver, 'T' is a number of information bits per frame, and the prescribed code rate of the encoder is adapted to  $1/3$  when a prescribed ratio  $N/I \leq 3$ ,  $1/4$  when  $3 < N/I \leq 4$ , and  $1/5$  when  $N/I > 4$ .

60. (Withdrawn) The device of claim 56, wherein the encoder is a turbo encoder with a maximum code rate of  $1/5$ .

Claims 61-83. (Canceled).

84. (Previously Presented) The method of claim 43, wherein the method is implemented during variable data rate mode and/or flexible data rate mode.

85. (Previously Presented) The method of claim 43, wherein the method is used for radio configuration (RC)4 of a physical channel.

86. (Withdrawn) The device of claim 56, wherein the method is implemented during flexible data rate mode and/or variable data rate mode.

87. (Withdrawn) The device of claim 59, wherein the prescribed ratio is  $8/3$ .
88. (Withdrawn) The ~~method~~-device of claim 56, wherein the adapted code rate of the encoder is one of  $1/2$ ,  $1/3$ ,  $1/4$ , and  $1/5$ .
89. (Withdrawn) The ~~method~~-device of claim 88, wherein 'N' is a size of an interleaver, 'T' is a number of information bits per frame, and the prescribed code rate of the encoder is adapted to  $1/3$  when a prescribed ratio  $<N/I \leq 3$ ,  $1/4$  when  $3 < N/I \leq 4$ , and  $1/5$  when  $N/I > 4$ .
90. (Withdrawn) The ~~method~~-device of claim 56, wherein the encoder is a turbo encoder with a maximum code rate of  $1/5$ .
91. (Withdrawn) The ~~method~~-device of claim 56, wherein coded bit puncturing is enabled for coded bit groups having indices  $2j$  and  $2j+1$  if  $(j \bullet k) \bmod J < K$ , wherein 'T' is a number of information bits per frame, 'J' equals  $\lfloor I/2 \rfloor$ , 'N' is a size of the interleaver, 'K' equals  $\lfloor (L-N)/2 \rfloor$ , and 'L' is a number of coded bits, and wherein each of the coded bit groups comprises  $L/I$  coded bits.

92. (Withdrawn) The ~~method~~-device of claim 91, wherein the information bits include data bits and a pattern used to puncture the coded bit group 'i' for the adapted code rate of 1/3 turbo code rate when a prescribed ratio  $N < N \leq 3I$  is given by  $P_{(i \bmod 2)}$ , wherein 'i' is an index of the coded bit groups and ranges from 0 to I-1, and wherein the pattern to puncture coded bit groups corresponding to coded bits of data bits is '110' for  $P_0$  and '101' for  $P_1$ , where '1' indicates no puncturing of the coded bit in the coded bit group 'i' and '0' indicates puncturing of the coded bit in the coded bit group 'i'.

93. (Withdrawn) The ~~method~~-device of claim 92, wherein the information bits further include tail bits, and a pattern to puncture symbol groups corresponding to coded bits of tail bits is '101' for  $P_0$  and '101' for  $P_1$ .

94. (Withdrawn) The ~~method~~-device of claim 91, wherein the information bits include data bits, and a pattern used to puncture the coded bit group 'i' for the adapted code rate of 1/4 turbo code rate when  $3I < N \leq 4I$  is given by  $P_{(i \bmod 2)}$ , wherein 'i' is an index of the coded bit groups and ranges from 0 to I-1, and wherein the pattern to puncture coded bit groups corresponding to coded bits of data bits is '1011' for  $P_0$  and '1110' for  $P_1$ , where '1' indicates no puncturing of the coded bit in the coded bit group 'i' and '0' indicates puncturing of the coded bit in the coded bit group 'i'.



95. (Withdrawn) The ~~method~~-device of claim 94, wherein the information bits further include tail bits, and a pattern to puncture coded bit groups corresponding to coded bits of tail bits is '1011' for  $P_0$  and '1011' for  $P_1$ .

96. (Withdrawn) The ~~method~~-device of claim 91, wherein the information bits include data bits, and a pattern used to puncture the coded bit group 'i' for the adapted code rate of 1/5 turbo code rate when  $4I < N \llbracket \leq \rrbracket < 5I$  is given by  $P_{(i \bmod 2)}$ , wherein 'i' is an index of the coded bit groups and ranges from 0 to I-1, and wherein the pattern to puncture coded bit groups corresponding to coded bits of data information bits is '11101' for  $P_0$  and '11011' for  $P_1$ , where '1' indicates no puncturing of the coded bit in the coded bit group 'i' and '0' indicates puncturing of the coded bit in the coded bit coded bit group 'i'.

97. (Withdrawn) The ~~method~~-device of claim 96, wherein the information bits further include tail bits and a pattern to puncture coded bit groups corresponding to coded bits of tail bits is '11011' for  $P_0$  and '11011' for  $P_1$ .

98. (Canceled).

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99. (Withdrawn) The device of claim 56, wherein the prescribed data rate is a flexible data rate or a variable data rate.

Claims 100-101. (Canceled).

102. (Withdrawn) The device of claim 56, wherein the encoder is a turbo encoder.

103. (Withdrawn) The device of claim 56, wherein the adapted code rate of the encoder is one of  $1/3$ ,  $1/4$ , and  $1/5$ .